Abstracts: Plenary Speakers

David Blecher (Houston) `dblecher@math.uh.edu`
APPLICATIONS OF A KIND OF POSITIVITY IN OPERATOR ALGEBRAS
Monday, August 8, MC4020, 2:00–2:50

We give some applications of a kind of positivity in nonselfadjoint operator algebras, related to new properties of approximate identities in operator algebras due to C. Read, and Read and the author. Much of this is joint work with Read or with M. Neal.

H. Garth Dales (Leeds & Lancaster) `H.G.Dales@leeds.ac.uk`
MULTI-NORMS, DUALITY, AND THE INJECTIVITY OF $L^p(G)$
Friday, August 5, MC4020, 9:00–9:50

In work with M. Polyakov [1], I studied when various left modules over a group algebra $L^1(G)$ are projective or injective or flat, and quite a few results were obtained. For example, it was noted that $L^p(G)$ is injective whenever the locally compact group G is amenable, and it was conjectured that the converse holds. An attack on this conjecture led to its reformulation as a question involving 'multi-norms'; I have spoken previously about multi-norms.

In the present talk, I shall first recall quickly some notions from multi-norm theory - and introduce some new multi-norms. Connections between multi-norms are determined by using some theory of absolutely summing operators [4]. One new multi-norm is defined on Banach lattices, and resolves some questions in that theory.

Second, I shall explain how this theory does indeed lead to a positive solution of the above conjecture (this is joint work with Matt Daws, Hung Le Pham, and Paul Ramsden [3]); some combinatorial conditions related to the amenability of groups from [5] will be mentioned.

Finally I shall develop a new theory of 'dual multi-norms'; this involves various notions of decomposability of Banach spaces in terms of multi-norms. The theory is particularly successful in the case of Banach lattices, mainly because of a striking theorem of the the late Nigel Kalton [6] that I shall explain.

I hope that all relevant papers will be placed in a special part of my website by the time that the conference begins.

[1] H. G. Dales and M. E. Polyakov, *Homological properties of modules over group algebras*, Proc. London Math. Soc. (3), 89 (2004), 390–426.

[2] H. G. Dales and M. E. Polyakov, *Multi-normed spaces*, preprint.

[3] H. G. Dales, M. Daws, H. L. Pham, and P. Ramsden, *Multi-norms and the injectivity of $L^p(G)$*, submitted to Proc. London Math. Soc., `arXiv:1101.4320v1 [math.FA]`.

[4] H. G. Dales, M. Daws, H. L. Pham, and P. Ramsden, *Equivalence of multi-norms*, in preparation.

[5] H. G. Dales, M. Daws, H. L. Pham, and P. Ramsden, *Multi-norms and the amenability of groups*, in preparation.

[6] N. J. Kalton, *Hermitian operators on complex Banach lattices and a problem of Garth Dales*, submitted to Proc. London Math. Soc.

Matthew Daws (Leeds) `matt.daws@cantab.net`

SHIFT INVARIANT PREDUALS OF GROUP ALGEBRAS

Saturday, August 6, MC4020, 9:00–9:50

For a discrete semigroup S, the Banach space $\ell^1(S)$ admits a canonical predual $c_0(S)$. When, say, S is cancellative (in particular, if S is a group) then the resulting weak*-topology on $\ell^1(S)$ is such that the algebra product is separately continuous. We say that $\ell^1(S)$ is a dual Banach algebra, with respect to $c_0(S)$.

Now, as a Banach space, $\ell^1(S)$ admits many different preduals, which induce different weak*-topologies upon $\ell^1(S)$. However, these might not make $\ell^1(S)$ into a dual Banach algebra.

In the first part of the talk, I will discuss joint work with Hung le Pham and Stuart White. We will exhibit semigroups S such that $c_0(S)$ is the only predual turning $\ell^1(S)$ into a dual Banach algebra. The algebra $\ell^1(S)$ is also a coalgebra for a coproduct which pre-dualises the multiplication on $\ell^\infty(S)$. If S is a group, we show that $c_0(S)$ is the only predual making both the product and the coproduct weak*-continuous. However, we give examples of semigroups S which admit continuum many different preduals, all making the product and coproduct weak*-continuous on $\ell^1(S)$.

In the second part of the talk, I will discuss joint work with Richard Haydon, Thomas Schlumprecht and Stuart White. Here we find a relatively concrete construction of a one-parameter family of preduals of $\ell^1(\mathbb{Z})$, each turning $\ell^1(\mathbb{Z})$ into a dual Banach algebra. Time allowing, I will sketch some abstract theory which "classifies" all dual Banach algebra preduals of $\ell^1(G)$ using semigroup compactification theory. In the case of $\mathbb{Z}$, this allows for a more abstract construction of preduals with many interesting properties (in particular, we find a dual Banach algebra predual which is not isomorphic to c_0 just as a Banach space).

Jean Erstele (Bordeaux I) esterle@math.u-bordeaux1.fr
LOWER NORM ESTIMATES FOR FUNCTIONAL CALCULUS ON QUASINILPOTENT SEMIGROUPS AND PSEUDOSPECTRUM OF GENERATORS
Thursday, August 4, MC4061, 9:00-9:50

We consider here semigroups $(T(t)) = (e^{-tA})$ of bounded linear operators on a Banach space X which norm-continuous on $(0, +\infty)$, or analytic on a sector $\mathcal{S}_\alpha := \{z \in \mathbb{C} \setminus \{0\} \mid |\arg(z)| < \alpha\}$ for some $\alpha \in (0, \pi/2]$, and look for lower estimates for the distance $\|T(t)-T(s)\|$, or more generally for $\|f(A)\|$, where A is the infinitesimal generator of the semigroup and f a sum of suitable exponential-polynomial functions. We focus on the case of quasinilpotent semigroups, and propose a new approach based on the pseudospectrum of their infinitesimal generator.

Zhiguo Hu (Windsor) zhiguohu@uwindsor.ca
A STONE-VON NEUMANN THEOREM ON QUANTUM GROUPS AND THE CONVOLUTION ALGEBRA $(T(L_2(\mathbb{G})), \triangleright)$
Wednesday, August 10, MC4061, 11:30-12:20

For a locally compact quantum group $\mathbb{G}$, the space $T(L_2(\mathbb{G}))$ of trace class operators on $L_2(\mathbb{G})$ is a Banach algebra with the multiplication $\triangleright$ induced by the right fundamental unitary of $\mathbb{G}$. In this talk, we present a generalized Stone-von Neumann theorem for locally compact quantum groups via the convolution $\triangleright$, extending the classical Stone-von Neumann theorem on locally compact groups. We discuss applications of this theorem to various problems around the quantum group algebra $L_1(\mathbb{G})$ and the operator convolution algebra $(T(L_2(\mathbb{G})), \triangleright)$.

This is joint work with Matthias Neufang and Zhong-Jin Ruan.

Matthias Neufang (Carleton & Fields & Lille I)
mneufang@math.carleton.ca
On problems of Ghahramani–Lau and Johnson
Friday, August 5, MC4020, 2:00–2:50

We present the solution, in full generality, of the Ghahramani–Lau conjecture (1994) and the solution, for a large class of Banach spaces, of a problem raised by B. Johnson (1972); the first is joint work with V. Losert, J. Pachl and J. Steprāns, the second with my Ph.D. student D. Poulin.

The conjecture of F. Ghahramani and A.T.-M. Lau states that the measure algebra $M(G)$ over any locally compact group G is strongly Arens irregular. A key ingredient in our proof is a factorization result we obtain for the canonical module actions of $M(G)^{**}$ on $M(G)^{*}$. We also discuss topological centres of the biduals of some natural (one-sided) ideals in $M(G)$, as well as of measure algebras over non locally compact groups. Moreover, we point out how a version of the above-mentioned factorization technique can be used to study equi uniform continuity over locally compact quantum groups; this is joint work with J. Pachl and P. Salmi.

The problem posed by B. Johnson in which we shall be interested, concerns the (non-)amenability of the algebra $B(E)$ of bounded linear operators on a Banach space E. We prove that for any Banach space X which is not complemented in its bidual, $B(X^{**})$ is non-amenable, thus generalizing the previously known case $X = c_0$ due to N. Ozawa. In particular, $B(M)$ is non-amenable for any (infinite-dimensional) atomic von Neumann algebra M. We also show that for an arbitrary (infinite-dimensional) von Neumann algebra M with separable predual, $B(M)$ does not have a countable approximate diagonal. We obtain analogous results in the category of operator spaces and completely bounded maps.

Narutaka Ozawa (RIMS Kyoto) narutaka@kurims.kyoto-u.ac.jp
Survey on weak amenability for groups
Monday, August 8, MC4020, 9:00–9:50

One of the most basic tool in the study of Fourier series is Fejér's theorem which states that the Cesàro means of partial sums of the Fourier series of a given function converge to that function. More precisely, the Cesàro mean functions $\phi_n(k) = (1 - \frac{|k|}{n}) \vee 0$ on $\mathbf{Z}$ are uniformly bounded as *Herz–Schur* *multipliers* (in fact positive and contractive). A group Γ is said to be *weakly amenable* or have the *Cowling–Haagerup property* if Fejér's theorem holds for Γ; namely if there is a sequence (ϕ_n) of finitely supported functions with uniformly bounded Herz–Schur norm which converges to 1. (It is amenable if ϕ_n's are not only bounded but moreover positive type.) The class of weakly amenable groups contains many interesting examples such as free groups, which are not amenable. I will give a survey on weakly amenable groups.

Warning: The term "weakly amenable" for groups is unrelated to the same term for Banach algebras (so far).

Vern Paulsen (Houston) `vern@math.uh.edu`

A MULTIVARIABLE ANALOGUE OF ANDO'S THEOREM ON NUMERICAL RADIUS AND C*-ALGEBRAS WITH WEP

Tuesday, August 9, MC2065, 2:00–2:50

A classic theorem of T. Ando characterises operators that have numerical radius at most one as operators that admit a certain positive 2×2 operator matrix completion. In this talk we consider variants of Ando's theorem, in which the operators (and matrix completions) are constrained to a given C*-algebra. By considering $n \times n$ matrix completions, an extension of Ando's theorem to a multivariable setting is made. We show that the C*-algebras in which these extended formulations of Ando's theorem hold true are precisely the C*-algebras with the weak expectation property (WEP). We also show that a C*-subalgebra of $B(H)$ has WEP if and only if whenever a certain 3×3 (operator) matrix completion problem can be solved in matrices over $B(H)$, it can also be solved in matrices over the algebra. This last result gives a characterization of WEP that is independent of the particular representation and leads to a new characterisation of injective von Neumann algebras. We also give a new equivalent formulation of the Connes Embedding Problem as a problem concerning 3×3 matrix completions.

This talk is based on joint work with D. Farenick and A. Kavruk.

Hung Pham (Victoria, Wellington) `Hung.Le.Pham@ecs.vuw.ac.nz`

Homomorphisms from algebras of continuous functions

Thursday, August 4, MC4061, 2:00–2:50

In this talk, I will discuss the structure of (discontinuous) homomorphisms from the algebra $C_0(X)$ of continuous functions vanishing at infinity on a locally compact space X into another Banach algebra; in particular, the structure of their continuity ideals, the largest ideals on which the homomorphisms are continuous. It turns out that the continuity ideal of a homomorphism from $C_0(X)$ is always the intersection of a "compact" family of prime ideals. I will also discuss a partial converse of this statement, and the obstacles to the proof of the full converse.

Charles Read (Leeds) `read@amsta.leeds.ac.uk`

On the quest for positivity in operator algebras

Wednesday, August 3, MC4020, 2:00–2:50

We show that in every nonzero operator algebra with a contractive approximate identity (or c.a.i.), there is a nonzero operator T such that $\|I-T\| \leq 1$. In fact, there is a c.a.i. consisting of operators T with $\|I-2T\| \leq 1$. So, the numerical range of the elements of our contractive approximate identity is contained in the closed disk centre $\frac{1}{2}$ and radius $\frac{1}{2}$. This is the necessarily weakened form of the result for C^*-algebras, where there is always a contractive approximate identity consisting of operators with $0 \leq T \leq 1$ – the numerical range is contained in the real interval $[0,1]$.

Zhong-Jin Ruan (Illinois, Champaign-Urbana) `ruan@math.uiuc.edu`

Noncommutative Poisson boundaries over locally compact quantum groups

Wednesday, August 3, MC4020, 9:00–9:50

Possoin boundaries associated with groups and probability measures have played a very important role in the study of random walks (on discrete groups) and harmonic analysis and ergodic theory (on locally compact groups). In this talk, we study noncommutative Poisson boundaries over locally compact quantum groups. We show that many classical results are still true in the quantum group setting.

This is a recent joint work with Mehrdad Kalantar and Matthias Neufang.

Volker Runde (Alberta) vrunde@ualberta.ca

COMPLETE COMPACTNESS IN ABSTRACT HARMONIC ANALYSIS

Tuesday, August 9, MC2065, 9:00-9:50

It has been unknown to this day if $\mathrm{AP}(\hat{G})$, the space of all almost periodic functionals on the Fourier algebra $A(G)$ of a locally compact group is a C^*-subalgebra of G, except in a few cases such as if G is almost abelian or both discrete and amenable.

In his Diplomarbeit of 1982, under the supervision of G. Wittstock, H. Saar introduced the notion of complete compactness—a variant of compactness that takes operator space structures into account—, which, in turn, enables us to define the notion of completely almost periodic functionals on completely contractive Banach algebras.

We will show that, for a Hopf-von Neumann algebra (M, Γ) with M injective, the space of all completely almost periodic functionals on the completely contractive Banach algebra M_* forms a C^*-subalgebra of M.

Baruch Solel (Technion)

NON COMMUTATIVE HARDY ALGEBRAS

Wednesday, August 10, MC4061, 9:00–9:50

In this talk I will describe the study of certain non-self-adjoint operator algebras, the (non commutative) Hardy algebras, and their representation theory. We view these algebras as algebras of (operator valued) functions on their spaces of representations. We will show that these spaces of representations can be parameterized as unit balls of certain bimodules and the functions can be viewed as Schur class operator functions on these balls. We will provide evidence to show that the elements in these Hardy algebras behave very much like bounded analytic functions and the study of these algebras should be viewed as noncommutative function theory.

This is a joint work with Paul Muhly.

Abstracts: Other Invited Speakers

Jeronimo Alaminos (Granada) alaminos@ugr.es

Hyperreflexivity of the derivation space of some group algebras

Wednesday, August 3, MC4020, 11:00–11:25

Let G be a locally compact group with an open subgroup which has polynomial growth. Then the derivation space $\mathrm{Der}(L^1(G))$ is hyperreflexive in the space $B(L^1(G))$ of all bounded linear operators on $L^1(G)$.

Alistair Bird (Lancaster) a.bird@lancaster.ac.uk

A closed ideal of operators on generalized James spaces

Monday, August 8, MC4041, 4:00–4:25

A construction of Casazza and Lohman associates a Banach space $J(X)$ with each Banach space X having a monotone, normalized, unconditional Schauder basis, with $J(\ell_2)$ giving the original quasi-reflexive James space.

In general, however, Casazza and Lohman's space $J(X)$ need not be quasi-reflexive—or even separable. In joint work with Niels Laustsen (Lancaster), we show that if $J(X)$ is replaced with the subspace $j(X)$ spanned by the unit vector basis, then, though still not quasi-reflexive, under a mild assumption on $j(X)$, the Banach algebra $\mathcal{B}(j(X))$ contains a maximal ideal of codimension one, thus generalizing the fact that the ideal of weakly compact operators on a quasi-reflexive Banach space Y has codimension one in $\mathcal{B}(Y)$. In particular, this implies that the Banach space $j(X)$ is not isomorphic to its Cartesian square $j(X) \oplus j(X)$.

In addition, we show that: as a Banach sequence algebra with a bounded approximate identity, $j(X)$ can never be amenable; and under the same mild assumption as above, $j(X)$ does not embed in a Banach space with an unconditional basis.

Michael Brannan (Queen's, Kingston) mbrannan@mast.queensu.ca
APPROXIMATE IDENTITIES IN CONVOLUTION ALGEBRAS OF SOME FREE QUANTUM GROUPS
Tuesday, August 9, MC2065, 5:00–5:25

An interesting class of non-coamenable compact quantum groups is formed by the free orthogonal and free unitary quantum groups O_N^+ and U_N^+ ($N \geq 2$), which were introduced by S. Wang in 1993. In recent years, it has been shown that these quantum groups share a great deal of operator algebraic properties with the reduced C*- and von Neumann algebras of the free groups $\mathbb{F}_N$. In this talk, we will study the quantum convolution algebras $L^1(O_N^+)$ and $L^1(U_N^+)$. Although non-coamenability implies that these Banach algebras fail to admit bounded approximate identities, we show that they always admit central approximate identities, which are contractive in the multiplier norm. The analogous result for the Fourier algebra of $\mathbb{F}_N$ is well known, and due to Haagerup (1979).

Eggert Briem (Iceland) briem@hi.is
REAL BANACH ALGEBRAS AS $\mathcal{C}(\mathcal{K})$-ALGEBRAS
Saturday, August 6, MC4021, 12:00–12:25

The classical theorem of Gelfand provides a representation of a complex unital commutative Banach algebra as a subalgebra of $\mathcal{C}_{\mathbb{C}}(\mathcal{K})$ of continuous complex-valued functions defined on a compact Hausdorff space $\mathcal{K}$. Since the complex algebras can be regarded as a subclass of the real algebras, it is natural to ask what can be said about this larger class. A real commutative Banach algebra $\mathcal{A}$ does admit a Gelfand representation $a \to \hat{a}$ as in the complex case, where each $\hat{a} : \mathcal{K} \to \mathbb{C}$ is a continuous function. However, if we attempt to represent a commutative real Banach algebra as a subalgebra of $\mathcal{C}(\mathcal{K})$ of continuous *real*-valued functions in the same fashion it is in general not possible.

In this talk we will look at conditions on $\mathcal{A}$ which imply that the representation of $\mathcal{A}$ as a space of continuous functions is real, i.e. consists only of real-valued functions. Among the results mentioned we show that $\mathcal{A}$ has a real representation if and only if

$$r(a^2) \leq (a^2 + b^2) \text{ for all } a, b \in \mathcal{A},$$

where r is the spectral radius. This resembles Arens' result which says that $\mathcal{A}$ is isomorphic to the algebra $\mathcal{C}(\mathcal{K})$ if

$$\|a^2\| \leq \|a^2 + b^2\| \text{ for all } a, b \in \mathcal{A}.$$

We will begin the talk with a very short proof this result. The methods we use do not rely on the complexification of the algebra.

We will also look at more conditions which imply that $\mathcal{A}$ has a real representation and pose open problems.

[1] F. Albiac and E. Briem, *Representations of real Banach algebras*, J. Aust. Math. Soc., 88 (2010), 289-300.

[2] F. Albiac and E. Briem, *Real Banach algebras as $\mathcal{C}(\mathcal{K})$-algebras*, Quart. J. Math., to appear.

Kit Chan (Bowling Green State, Ohio) `kchan@bgsu.edu`

COMMON HYPERCYCLIC VECTORS FOR PATHS OF HYPERCYCLIC OPERATORS

Wednesday, August 3, MC4020, 4:00–4:25

A bounded linear operator $T : X \to X$ on an infinite dimensional, separable Banach space X is *hypercyclic* if there is a vector x whose orbit $\text{Orb}(T, x) = \{x, Tx, T^2x, \ldots\}$ is dense in X. Such a vector x is called a *hypercyclic vector*. The set $\mathcal{HC}(T)$ of all hypercyclic vectors of T is always a dense G_δ set . Hence an application of the Baire Category Theorem shows that if (T_n) is a countable family of hypercyclic operators, then the set $\cap\mathcal{HC}(T_n)$ of common hypercyclic vectors for (T_n) is also a dense G_δ set. On the other hand, for an uncountable family (T_t) of operators, the above Baire Category argument does not work and so it is interesting to study common hypercyclic vectors for (T_t). To that end, we say that $\{T_t : t \in [a, b]\}$ is a *path of hypercyclic operators* when the map $t \mapsto T_t$ is continuous with respect to the operator norm topology of the operator algebra $B(X)$. As it turns out there are naturally many paths of hypercyclic operators (T_t) for which $\cap\mathcal{HC}(T_t)$ is a dense G_δ set. For instance, if T is a hypercyclic operator then its conjugate orbit $\{A^{-1}TA : A \in B(X) \text{ is invertible}\}$ contains such a path of hypercyclic operators that is dense in $B(X)$ with the strong operator topology. When X is a Hilbert space, its unitary orbit $\mathcal{U}(T) = \{U^{-1}TU : U \text{ is unitary}\}$ contains such a path that is dense in $\mathcal{U}(T)$ with the strong operator topology.

This is joint work with Rebecca Sanders.

Pak Keung (Danny) Chan (Carleton) cpk634@yahoo.com
TOPOLOGICAL CENTERS OF MODULE ACTIONS
INDUCED BY UNITARY REPRESENTATIONS
Friday, August 5, MC4060, 4:00–4:25

I will first review notions of bilinear maps and the concept of regularity which was defined by Arens. Then I will talk about the particular case for a Banach algebra, mentioning some results related to abstract harmonic analysis, such as the topological center of $L^1(G)$ and $LUC(G)$. Last, I will introduced the topolgical center problem of module action induced by a unitary representation, giving a characterization when the center is minimal. I will also give examples that the center is maximal and neither.

Yemon Choi (Saskatchewan) choi@math.usask.ca
COMMUTATIVE AMENABLE OPERATOR ALGEBRAS
Tuesday, August 9, MC2065, 11:00–11:25

It has been conjectured that every amenable, norm-closed subalgebra of $\mathcal{B}(\mathcal{H})$ is similar to a self-adjoint one. This has been proved by Gifford for subalgebras of $\mathcal{K}(\mathcal{H})$; but outside the compact case, progress has been difficult, and the question remains open even for singly generated subalgebras.

After a brief discussion of the partial results to date, and why progress seems to be difficult, I will give a sketch of recent work, showing that commutative, (operator) amenable subalgebras of finite von Neumann algebras are similar to self-adjoint subalgebras – a result which appears to be new even in the singly generated case.

Jason Crann (Carleton) jcrann@connect.carleton.ca
ABSTRACT HARMONIC ANALYSIS AND QUANTUM INFORMATION THEORY
Thursday, August 4, MC4060, 10:00–10:25

The recent representation theory of locally compact quantum groups has initiated several new connections between harmonic analysis and quantum information. In this talk, we will explore some of these connections and demonstrate how one can generate an intriguing class of quantum channels for every locally compact quantum group. Time permitting, we will also discuss some applications to quantum error correction and to the convex structure of bistochastic channels.

This is joint work with Matthias Neufang.

Elcim Elgun (Waterloo) `eelgun@uwaterloo.ca`

On West compactifications of locally compact Abelian groups

Wednesday, August 3, MC4020, 4:30–4:55

It is known that, using an idea of West, the unit ball of $L^\infty[0,1]$ can be identified as a compactification of $\mathbb{Z}$. In this talk, we will generalize this result to any l.c.a group G. Depending on the algebraic properties of G, we will construct a semigroup compactification as a certain compact subsemigroup of $L^\infty[0,1]$, which is a quotient of both the Eberlein compactification, G^e, and the weakly almost periodic compactification, G^w, of G. The concrete structure of these compact quotients allows us to gain insight into known results by G. Brown, W. Moran and J. Pym, where for the groups $G = \mathbb{Z}$ and $G = \mathbb{Z}_q^\infty$, it is proved that G^e and G^w contain uncountably many idempotents and the set of idempotents is not closed.

Yasser Farhat (Laval) `yasser.farhat.1@ulaval.ca`

Simplicial cohomology of $l^1(\mathbb{N})$ and other semi-group algebras

Thursday, August 4, MC4061, 4:30–4:55

In [1], the authors showed that simplicial cohomology groups $H^n(A, A^*)$ vanish for all $n \geq 2$, where A is the unital Banach algebra $l^1(\mathbb{N})$. To do so, they determined the cyclic cohomology of A, $HC^n(A, A^*)$ and used the Connes-Tzygan long exact sequence to deduce the result for $H^n(A, A^*)$. As part of my PhD work (supervisor: F. Gourdeau), I have succeeded in obtaining $H^n(A, A^*) = 0$, for all $n \geq 2$, without using cyclic cohomology. To do so, I have obtained explicitly a contracting homotopy map which is close to the one used for cyclic cohomology: for $T \in Z^n(A, A^*)$, we therefore get explicity $R \in C^{n-1}(A, A^*)$ such that $T = \delta^{n-1} R \in N^n(A, A^*)$. I have generalized this method to other semigroup algebras and will briefly describe some of these generalizations.

[1] F. Gourdeau, B. E. Johnson and M. C. White, *The cyclic and simplicial cohomology of* $\ell^1(\mathbb{N})$, Trans. Amer. Math. Soc., 357, (2005) 5097-5113.

Joel Feinstein (Nottingham) `Joel.Feinstein@nottingham.ac.uk`
ENDOMORPHISMS OF COMMUTATIVE SEMIPRIME BANACH ALGEBRAS
Thursday, August 4, MC4061, 11:00–11:25

This talk concerns joint work with H. Kamowitz on compact, power compact, Riesz, and quasicompact endomorphisms of commutative Banach algebras.

We have shown that if B is a unital commutative semisimple Banach algebra with connected character space, and T is a unital endomorphism of B, then T is quasicompact if and only if the operators T^n converge in operator norm to a rank-one unital endomorphism of B.

We have extended these results in two ways: we have obtained results for endomorphisms of commutative Banach algebras which are semiprime and not necessarily semisimple; we also have results for commutative Banach algebras with character spaces which are not necessarily connected.

We shall discuss our results, along with a selection of related examples and open questions.

Maria Fragoulopoulou (Athens) `fragoulop@math.uoa.gr`
UNBOUNDED TENSOR PRODUCT OPERATOR ALGEBRAS
Friday, August 5, MC4020, 4:00–4:25

It is known that the Tomita–Takesaki (for short $T-T$) theory plays an important role in the study of the structure of von Neumann algebras and the physical applications. The extension of the $T-T$ theory to $*-$algebras of closable operators, called O^*-algebras (introduced by G. Lassner, in 1972), is a contribution of A. Inoue (1998, Springer). A motivation for this was given by the Whightman quantum field theory and quantum mechanics. Among O^*–algebras, are the so called GW^*–algebras (generalized standard von Neumann algebras), also initiated by A. Inoue, in 1978, for the needs of the unbounded $T-T$ theory. Our first results on tensor products of unbounded operator algebras (2010) concerned GB^*-algebras (generalized C^*-algebras), that were introduced by G.R. Allan, in 1967, and also form algebras of unbounded operators (Dixon). Both, GB^*-algebras and GW^*-algebras contain a C^*-algebra resp. W^*-algebra that plays an essential role in the study of their structure. This will be also seen in our talk, where we consider tensor products of GW^*-algebras. This is done by defining tensor products of O^*-algebras and using unbounded commutants and bicommutants. For this aim the "weak" unbounded commutant of a tensor product O^*-algebra is studied. Uniqueness of the constructed GW^*-tensor product is encountered and the structure of the "properly W^*-infinite" GW^*-algebras is investigated. In this regard, one has that such an algebra $\mathcal{M}$ is $*-$isomorphic to the GW^*-tensor product $\mathcal{M} \overset{\mathrm{GW}^*}{\otimes} \mathcal{B}(\mathcal{K})$, for every separable Hilbert space $\mathcal{K}$, where $\mathcal{B}(\mathcal{K})$ is the C^*-algebra of all bounded linear operators on $\mathcal{K}$. In a forthcoming paper, joint with A. Inoue and K.-D. Kürsten, we use GW^*-tensor products in order to construct and study crossed products of unbounded operator algebras.

This is a joint work with A. Inoue and M. Weigt.

Adam Fuller (Waterloo) `a2fuller@math.uwaterloo.ca`

FINITELY CORRELATED REPRESENTATIONS OF θ-COMMUTING ROW-CONTRACTIONS

Monday, August 8, MC4020, 5:00–5:25

A row-contraction A is a contractive map from $\mathcal{H}^{(m)}$ to $\mathcal{H}$. It is determined by m contractions $A_1, \dots, A_m$ on $\mathcal{H}$ satisfying $\sum_{i=1}^m A_i A_i^* \leq I$, so that $A = [A_1, \dots, A_m]$. Two row-contractions $A = [A_1, \dots, A_m]$ and $B = [B_1, \dots, B_n]$ are said to θ-commute if there is a permutation $\theta \in \mathrm{S}_{mn}$ such that $A_i B_j = B_{j'} A_{i'}$ when $\theta((i,j)) = (i', j')$.

Here we will completely classify *finitely correlated* θ-commuting coisometric row-isometries, i.e. the θ-commuting unitary row-contractions on $\mathcal{H}$ containing a finite-dimensional subspace $\mathcal{V}$ which is coinvariant and cyclic for the contractions $A_1, \dots, A_m, B_1, \dots, B_n$.

Finally we will discuss how these results generalise to representations of k-graphs and product systems of C^*-correspondences.

Fereidoun Ghahramani (Manitoba) `fereidou@cc.umanitoba.ca`

A CHARACTERIZATION OF VANISHING SUBALGEBRAS OF GROUP ALGEBRAS

Friday, August 5, MC4020, 11:30–11:55

Suppose that G is a locally compact group and $L^1(G)$ is the group algebra of G. Let S be a measurable subset of G and L_S be the subspace of $L^1(G)$ consisting of all functions that vanish off S, a.e. In 1959 Arthur B. Simon (Trans. Amer. Math. Soc.) found necessary or sufficient conditions for L_S to be a subalgebra of $L^1(G)$; he called these algebras *vanishing algebras.* Further sufficient conditions were later found by T.S. Liu (1963, Proc. Amer. Math. Soc.), R. Rigelhof (1964, Proc. Amer. Math. Soc.) and Gulick–Liu–van Rooij (1970, Trans. Amer. Math. Soc.,). Recently, the question has been also reiterated — in a slightly different, but equivalent formulation — by A. Lau and R. Loy (2008, J. Funct. Anal.). In this talk I will sketch a proof that shows, L_S is an algebra if and only if S is *locally a semigroup.*

Ilja Gogic (Zagreb) ilja@math.hr

ELEMENTARY OPERATORS AND SUBHOMOGENEOUS C^*-ALGEBRAS

Monday, August 8, MC4020, 4:30–4:55

We are interested in a problem of characterizing unital separable C^*-algebras A satisfying the following condition:

(P) The set of all elementary operators on A is closed in the operator norm.

A necessary condition for A to satisfy (P) is the existence of a finite number of elements of A whose canonical images linearly generate every 2-primal quotient of A (in particularly, A must be subhomogeneous, and the C^*-bundles corresponding to the homogeneous sub-quotients of A must be of finite type). The converse is also true if the canonical C^*-bundle $\mathfrak{A}$ over the maximal ideal space of the center of A is continuous. Moreover, we have the following result:

Theorem. Let A be a unital separable C^*-algebra such that $\mathfrak{A}$ is continuous. Then the following conditions are equivalent:

(i) A satisfies (P),

(ii) there exists a finite number of elements of A whose canonical images linearly generate every 2-primal quotient of A,

(iii) fibres of $\mathfrak{A}$ have uniformly finite dimensions, and each restriction bundle of $\mathfrak{A}$ over a set where its fibres are of constant dimension is of finite type as a vector bundle,

(iv) A as a Banach module over its center is topologically finitely generated.

Frédéric Gourdeau (Laval) Frederic.Gourdeau@mat.ulaval.ca
SIMPLICIAL AND CYCLIC COHOMOLOGY OF BANACH ALGEBRAS
Thursday, August 4, MC4061, 4:00–4:25

In this talk, I will present recent advances in our work (with Y. Choi and M. C. White), focusing on the Cuntz-semigroup algebra $l^1(S)$, which have led us to a better understanding of some of the general machinery which has been effective in tackling l^1 semigroup algebras.

The method we will discuss uses cyclic cohomology, a feature which has eased calculations but which might not seem desirable as it does not necessarily ease the construction of explicit contracting homotopy maps for simplicial cohomology or the construction of biprojective resolution of the algebras considered. However, as recent work of my PhD student Y. Farhat has shown, some modification of the maps introduced in cyclic cohomology can lead to explicit construction for simplicial cohomology. I believe that much more is to come from this approach, beyond discrete l^1 semigroup algebras.

Colin Graham (British Columbia) ccgraham@alum.mit.edu
A NEW (WEAK* LIMIT) PROOF OF SPECTRAL SYNTHESIS FOR SINGLETONS
Saturday, August 6, MC4020, 12:00–12:25

That singletons obey spectral synthesis has been known for more than 75 years. (That is, if $f \in A(G)$ has $f(x) = 0$, then there exists $f_n \in A(G)$ with $f_n = 0$ in a neighbourhood of x and $\|f - f_n\| \to 0$). A new proof of this result is given, using a striking lemma of Rodríguez-Piazza. The lemma, which deserves to be better known, raises an interesting question.

Ed Granirer (British Columbia) granirer@math.ubc.ca
FUNCTIONAL ANALYTIC PROPERTIES OF SOME BANACH ALGEBRAS RELATED TO THE FOURIER ALGEBRA
Wednesday, August 10, MC4060, 11:00–11:25

Functional analytic properties including, the RNP, weak sequential completeness, non-factorisation, Arens regularity, and strict containment, are studied for the Banach algebras $A_p^r(G) = A_p \cap L^r(G)$, where G is a locally compact group and $A_p(G)$ is the Figa-Talamanca-Herz algebra of G – thus $A_2(G)$ is the Fourier algebra of G .

Ryan Hamilton (Waterloo) hamiltrj@gmail.com

Operator corona problems

Tuesday, August 9, MC2065, 4:00–4:25

Given any algebra $\mathcal{A}$ of operators on a Hilbert space H, when does the condition $\sum_{i=1}^{n} A_i A_i^* \geq \delta^2$ for $A_1, \ldots, A_n \in \mathcal{A}$ ensure the existence of $B_1, \ldots, B_n \in \mathcal{A}$ such that $\sum_{i=1}^{n} A_i B_i = I_H$. In other words. if the row operator $[A_1, \ldots, A_n]$ has a right inverse $[B_1, \ldots, B_n]^T$, when can the B_i be taken from $\mathcal{A}$? For the analytic Toeplitz algebra, Arveson (1975) provided a proof independent of the classical corona theorem of Carleson. He also solved the problem for nest algebras, where stronger hypotheses are required. In this talk, we will discuss a recent treatment of this problem for a wide class of algebras of analytic functions with domains in the unit ball of $\mathbb{C}^n$. In analogy with the nest algebra case, stronger hypotheses are generally required.

Alexander Helemskii (Moscow State) helemskii@rambler.ru

Metric versions of projectivity for normed spaces and modules

Thursday, August 4, MC4061, 11:30–11:55

The notion of a projective module, basic in homological algebra, was carried over to functional analysis about 40 years ago. It was formulated in terms of the norm topology of modules in question. Recently, the rise of new areas of analysis, notably operator space theory, has caused the introduction and study of versions of these notions that take into account the exact value of the norm. In fact, there are two reasonable approaches, each one with its own advantages, providing the so-called extremally projective and metrically projective normed modules. Their definitions depend on the choice of surjective morphisms, participating in the respecting lifting problems. The first approach was stimulated by the work of Grothendieck (1955), and the second by that of Semadeni (1966).

At the beginning we put the metric pro- and injectivity on a formal general-categorical foundation. This allows, in particular, to connect projectivity with the proper notion of freedom, and injectivity with cofreedom.

Then we give the characterization of metrically projective normed spaces (= $\mathbb{C}$-modules): they turn out to be $l_1^0(M)$, that is normed subspaces of $l_1(M)$, consisting of finitely supported functions. Thus in the "metric" context the projectivity coincides with the freedom (whereas the injectivity is wider than cofreedom).

In the remaining part of the talk we concentrate on basic algebras of the next degree of complication after $\mathbb{C}$: sequence algebras, satisfying some natural conditions. We give a full characterization of extremely projective objects within the fairly wide class of normed modules over such an algebra, consisting of non-degenerate homogeneous modules. We consider two cases, 'non-complete' and 'complete', and the answers in these cases are essentially different.

In particular, all Banach non-degenerate homogeneous modules, consisting of sequences, are extremely projective within the class of Banach non-degenerate homogeneous modules. However, neither of them, when it is infinite-dimensional, is extremely projective within the class of all normed non-degenerate homogeneous modules. On the other hand, submodules of these modules, consisting of finite sequences, are extremely projective within the latter class.

Alexander Izzo (Bowling Green State, Ohio) aizzo@bgnet.bgsu.edu
FUNCTION ALGEBRAS INVARIANT UNDER GROUP ACTIONS
Monday, August 8, MC4020, 11:30–11:55

Motivated by his work on a conjecture of William Arveson in operator theory, Ronald Douglas raised the following question, where S denotes the unit sphere in complex n-space. If A is a function algebra on S that contains the ball algebra $A(S)$ and whose maximal ideal space is S, and if A is invariant under the action of the n-torus on S, does it follow that $A = C(S)$? When $n = 1$, Wermer's maximality theorem gives immediately that the answer is yes. Surprisingly, in higher dimensions the answer depends on the dimension. We will discuss the solution to Douglas's question and present related results of a more general nature concerning function algebras that are invariant under group actions.

Mehrdad Kalantar (Carleton & Illinois, Champaign-Urbana)
mkalanta@math.carleton.ca
CONVOLUTION ALGEBRAS OVER LOCALLY COMPACT QUANTUM GROUPS
Saturday, August 6, MC4021, 11:30–11:55

In this talk I consider various convolution-type algebras associated with a locally compact quantum group from a cohomological point of view. We see that the (quantum group) duality endows the space of trace class operators over a locally compact quantum group with two products which are operator versions of convolution and pointwise multiplication, respectively; we investigate the relation between these two products, and derive a formula linking them. Furthermore, I will talk about some canonical module structures on these convolution algebras, and show that certain topological properties of a quantum group, correspond to cohomological properties of these modules. In particular, some of the results proved by Pirkovskii in the l.c. group setting are generalized to the quantum setting.

This talk is based on a joint work with Matthias Neufang.

Tomasz Kania (Lancaster) `t.kania@lancaster.ac.uk`

UNIQUENESS OF THE MAXIMAL IDEAL OF THE BANACH ALGEBRA OF BOUNDED OPERATORS ON $C([0,\omega_1])$

Saturday, August 6, MC4021, 11:00–11:30

Let ω_1 be the smallest uncountable ordinal. By a result of Rudin, bounded operators on the Banach space $C([0,\omega_1])$ have a natural represention as $(\omega_1+1)\times(\omega_1+1)$-matrices. Loy and Willis observed that the set of operators whose final column is continuous when viewed as a scalar-valued function on $[0,\omega_1]$ defines a maximal ideal of codimension one in the Banach algebra $\mathcal{B}(C([0,\omega_1]))$ of bounded operators on $C([0,\omega_1])$. We give a coordinate-free characterization of this ideal and deduce from it that $\mathcal{B}(C([0,\omega_1]))$ contains no other maximal ideals, and we then describe the strictly smaller ideal $\mathcal{X}(C([0,\omega_1]))$ of operators with separable range.

This is joint work with Niels Jakob Laustsen.

Craig Kleski (Virginia) `cmk5b@virginia.edu`

BOUNDARIES FOR OPERATOR SYSTEMS

Monday, August 8, MC4020, 10:00–10:25

In 2006, Arveson resolved a long-standing problem by showing that for any element x of a separable self-adjoint subspace S of $B(H)$, the norm of x is $\sup\|\pi(x)\|$, where π runs over the boundary representations for S. We show that "sup" can be replaced by "max". This implies that the Choquet boundary for a separable operator system is a boundary in the classical sense.

Marek Kosiek (Jagielloński, Kraków) `Marek.Kosiek@im.uj.edu.pl`
FIBERS OF THE L^∞ ALGEBRA AND THE DISINTEGRATION OF MESURES
Wednesday, August 3, MC4021, 4:00–4:25

It is shown that Gelfand transforms of elements $f \in L^\infty(\mu)$ are almost constant at almost every fiber $\Pi^{-1}(\{x\})$ of the spectrum of $L^\infty(\mu)$ in the following sense: for each $f \in L^\infty(\mu)$ there is an open dense subset $U = U(f)$ of this spectrum having full measure and such that the Gelfand transform of f is constant on the intersection $\Pi^{-1}(\{x\}) \cap U$.

As an application it is obtained a new approach to disintegration of measures, allowing one to drop the usually taken separability assumption.

This is joint work with Krzysztof Rudol.

Julia Kuznetsova (Luxembourg) `julia.kuznetsova@uni.lu`
AUTOMATIC CONTINUITY OF GROUP REPRESENTATIONS AND HOMOMORPHISMS
Friday, August 5, MC4060, 4:30–4:55

Let G be a locally compact group, and let U be its unitary representation on a Hilbert space H. Endow the space $\mathcal{L}(H)$ of linear bounded operators on H with weak operator topology. We prove that if U is a measurable map from G to $\mathcal{L}(H)$ then it is continuous. This result was known before for separable H.

We prove also that under additional axioms of the set theory, e.g. under CH, every measurable homomorphism from a locally compact group into any topological group is continuous. This result belongs to a wide area of research in general topology and measure theory.

Niels Jakob Laustsen (Lancaster) `n.laustsen@lancaster.ac.uk`
A VERY PROPER HEISENBERG–LIE BANACH $*$-ALGEBRA
Monday, August 8, MC4041, 10:00–10:25

Let $q_1, q_2 \in \mathbb{R} \setminus \{0\}$. A pair of elements c_1 and c_2 of a $*$-algebra satisfy the *$*$-algebraic (q_1, q_2)-deformed Heisenberg–Lie commutation relations* if

$$c_1 c_1^* - q_1 c_1^* c_1 = c_2 \qquad \text{and} \qquad q_2 c_1 c_2 - c_2 c_1 = 0.$$

In joint work with Silvestrov, we constructed a unital Banach $*$-algebra $\mathcal{C}_{q_1,q_2}$ which contains a universal normalized solution to the $*$-algebraic (q_1, q_2)-deformed Heisenberg–Lie commutation relations. More recently, I have proved that for $(q_1, q_2) = (-1, 1)$, this Banach $*$-algebra is *very proper;* that is, if $M \in \mathbb{N}$ and $a_1, \ldots, a_M$ are elements of $\mathcal{C}_{-1,1}$ such that $\sum_{m=1}^{M} a_m^* a_m = 0$, then necessarily $a_1 = a_2 = \cdots = a_M = 0$. I shall discuss these results from first principles.

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[2] N. J. Laustsen and S. D. Silvestrov, Heisenberg–Lie commutation relations in Banach algebras, *Math. Proc. Royal Irish Acad.*, 109A (2009), 163–186.

Hun Hee Lee (Chungbuk National) `hhlee@chungbuk.ac.kr`

SOME BEURLING-FOURIER ALGEBRAS ARE ISOMORPHIC TO OPERATOR ALGEBRAS

Monday, August 8, MC4020, 11:00–11:25

An old result of Varopoulos ('72) says that the Beurling algebra (a weighted convolution algebra) $\ell^1(\mathbb{Z}; \omega_\alpha)$, where $\omega_\alpha(n) = (1+|n|)^\alpha$, $\alpha \geq 0$, is an injective Banach algebra if and only if $\alpha > 1/2$. If we adopt a modern language of operator spaces, then we may reformulate the above as follows. $\ell^1(\mathbb{Z}; \omega_\alpha)$ *with its natural operator space structure is completely isomorphic to an operator algebra if and only if* $\alpha > 1/2$.

On the other hand, very recently, a concept of weighted Fourier algebra, namely Beurling-Fourier algebra on compact groups has been introduced and investigated by Ludwig, Spronk and Turowska, and by myself and Samei. In this talk we will consider Beurling-Fourier algebras on certain compact groups which are completely isomorphic to an operator algebra. Our main examples of compact groups cover connected semisimple compact Lie groups including $\mathrm{SU}(n)$.

Kristopher Lee (Clarkson) leekm@clarkson.edu

GENERALIZED WEAK PERIPHERAL MULTIPLICATIVITY IN ALGEBRAS OF LIPSCHITZ FUNCTIONS

Tuesday, August 9, MC2017, 4:30–4:55

There has been much work done in analyzing maps between Banach algebras that preserve certain spectral properties. Given a pointed compact metric space (X, d_X) with distinguished base point e_X, let $\mathrm{Lip}_0(X)$ denote the Banach algebra of all complex-valued Lipschitz functions that map e_X to 0. As $\mathrm{Lip}_0(X)$ need not have an identity, the spectrum of an element of $\mathrm{Lip}_0(X)$ may not exist. However, for uniform algebras, it is known that the range of a function is contained in the spectrum. Thus one can instead study mappings that preserve certain range properties, if the spectrum does not exist.

We investigate four surjective mappings $T_1, T_2 \colon \mathrm{Lip}_0(X) \to \mathrm{Lip}_0(Y)$ and $S_1, S_2 \colon \mathrm{Lip}_0(X) \to \mathrm{Lip}_0(X)$ that satisfy

$$\mathrm{Ran}_\pi(T_1(f)T_2(g)) \cap \mathrm{Ran}_\pi(S_1(f)S_2(g)) \neq \varnothing$$

for all $f, g \in \mathrm{Lip}_0(X)$, where $\mathrm{Ran}_\pi(f)$ denotes the range values of maximum modulus, and show that T_1 and T_2 are generalized weighted composition operators. In particular, there exist mappings $\varphi_1, \varphi_2 \colon Y \to \mathbb{C}$, with $\varphi_1(y)\varphi_2(y) = 1$ for all $y \in Y$, and a Lipschitz homeomorphism $\psi \colon Y \to X$, with $\psi(e_Y) = e_X$, such that

$$T_j(f)(y) = \varphi_j(y)S_j(f)(\psi(y))$$

for all $f \in \mathrm{Lip}_0(X)$, all $y \in Y$, and $j = 1, 2$.

This is joint owrk with A. Jiménez-Vargas, Aaron Luttman, and Moisés Villegas-Vallecillos.

Aaron Luttman (Clarkson) aluttman@clarkson.edu

SOME FURTHER RESULTS ON BOUNDARIES OF ALGEBRAS OF LIPSCHITZ FUNCTIONS

Monday, August 8, MC4041, 4:30–4:55

Given a compact Hausdorff space X, it is well known that every complex subalgebra $\mathcal{A}$ of the complex-valued, continuous functions on X, $C(X, \mathbb{C})$, contains a minimal closed boundary, i.e. a subset of X on which every function

$f \in \mathcal{A}$ attains its maximum modulus. The same result does not hold when $\mathcal{A}$ is an algebra with *real* scalars – even when the functions are complex-valued. The goal of this project was to explore the boundary structure of algebras of Lipschitz functions taking values in a Banach algebra over $\mathbb{R}$ with a multiplicative norm, i.e. satisfying $\|fg\| = \|f\|\|g\|$. Using the representation of non-commutative uniform algebras given by Jarosz, we give a new proof that the only such algebras are $\mathbb{R}$, $\mathbb{C}$, and $\mathbb{H}$ (the quaternions). Secondly, we provide a condition on (not necessarily complete) algebras of quaternion-valued Lipschitz functions that ensures that the algebra has a minimal closed boundary and that, in this particular case, the minimal closed boundary is the closure of the set of weak peak points.

This is joint work with Kassandra Averill, Ann Johnston, Ryan Northrup, and Robert Silversmith.

Zinaida Lykova (Newcastle, UK) `Zinaida.Lykova@ncl.ac.uk`

THE PROJECTIVITY OF C^*-ALGEBRAS AND THE TOPOLOGY OF THEIR SPECTRA

Friday, August 5, MC4060, 10:00–10:25

In this talk we investigate left projectivity of C^*-algebras which are not necessary commutative. We say a Banach algebra A is *hereditarily projective* if every closed left ideal of A is projective. A complete description of hereditarily projective commutative C^*-algebras $C(\Omega)$ as algebras having a hereditarily paracompact spectrum Ω was given by Helemskii in 1970. All C^*-algebras with strictly positive elements are left and right projective, and so all separable C^*-algebras are hereditarily projective. One can reduce the problem to commutative sub-C^*-algebras and show that no infinite-dimensional AW^*-algebra is hereditarily projective. However, it is quite difficult to get a complete description of left projective noncommutative C^*-algebras because of the richness of C^*-algebras. On the other hand, very broad classes of C^*-algebras can be obtained as C^*-algebras defined by continuous fields of very simple C^*-algebras. We give necessary and sufficient conditions for the left projectivity and biprojectivity of Banach algebras defined by locally trivial continuous fields of Banach algebras. We identify projective C^*-algebras $\mathcal{A}$ defined by locally trivial continuous fields $\mathcal{U} = \{\Omega, (A_t)_{t\in\Omega}, \Theta\}$ such that each C^*-algebra A_t has a strictly positive element. For a commutative C^*-algebra $\mathcal{D}$ contained in $\mathcal{B}(H)$, where H is a separable Hilbert space, we show that the condition of left projectivity of $\mathcal{D}$ is equivalent to the existence of a strictly positive element in $\mathcal{D}$ and so to the spectrum of $\mathcal{D}$ being a Lindelöf space. Results on the projectivity of C^*-algebras of continuous fields are joint work with D. Cushing.

Laura Marti Perez (Waterloo) `lrmarti@math.uwaterloo.ca`
THE FOURIER ALGEBRA OF A LOCALLY COMPACT GROUPOID
Monday, August 8, MC4020, 4:00–4:25

If G is a groupoid, the Fourier-Stieltjes and Fourier algebras of it have been defined and studied by Ramsay and Walter ('97), Renault ('97) and Paterson ('04). In this talk, we present a new definition of the Fourier algebra and discuss what are the properties we would like this algebra to verify. If we restrict ourselves to the family of locally trivial groupoids, we obtain a good description of the algebra in terms of the Haagerup tensor product of continuous function on the unit space of G and the Fourier algebra of its isotropy group.

Martin Mathieu (Queen's, Belfast) `m.m@qub.ac.uk`
SPECTRALLY BOUNDED AND SPECTRALLY ISOMETRIC OPERATORS
Tuesday, August 9, MC2065, 3:00–3:25

Invertibility preserving and spectrum preserving linear mappings between Banach algebras have been studied intensively and under a variety of aspects over the past decades. Spectrally bounded and spectrally isometric operators, respectively, are far reaching extensions of these concepts. The purpose of my talk is two-fold. I shall discuss new examples of spectrally bounded operators on general Banach algebras. This is joint work with Nadia Boudi (Meknes) and has appeared in Operator Theory: Advances and Applications 212 (2011), 1-15. I shall also present new types of unital C*-algebras on which every unital surjective spectral isometry is a Jordan isomorphism. This is recent joint work with Ahmed Sourour (Victoria, BC).

Mostafa Mbekhta (Lille I) mbekhta@math.univ-lille1.fr

NEW RESULTS ON LINEAR PRESERVERS PROBLEMS AND GENERALIZED INVERSES

Wednesday, August 3, MC4020, 10:00–10:25

Let H be an infinite-dimensional complex separable Hilbert space and $\mathcal{B}(H)$ the algebra of all bounded linear operators on H. In this talk, we discuss the following new results.

Theorem I. Let H be an infinite-dimensional separable Hilbert space and $\phi : \mathcal{B}(H) \to \mathcal{B}(H)$ a linear map preserving generalized invertibility in both directions. Assume that ϕ is surjective up to finite rank operators. Then

$$\phi(\mathcal{K}(H)) \subseteq \mathcal{K}(H)$$

and there exist an invertible element $\mathbf{a} \in \mathcal{C}(H)$ and either an automorphism $\tau : \mathcal{C}(H) \to \mathcal{C}(H)$ or an anti-automorphism $\tau : \mathcal{C}(H) \to \mathcal{C}(H)$ such that the induced map $\varphi : \mathcal{C}(H) \to \mathcal{C}(H)$, $\varphi(A + \mathcal{K}(H)) = \phi(A) + \mathcal{K}(H)$, $A \in \mathcal{B}(H)$, is of the form

$$\varphi(\mathbf{x}) = \mathbf{a}\tau(\mathbf{x}), \quad \mathbf{x} \in \mathcal{C}(H).$$

Theorem II. Let H be an infinite-dimensional separable Hilbert space and $\phi : \mathcal{B}(H) \to \mathcal{B}(H)$ a linear map preserving semi-Fredholm operators in both directions. Assume that ϕ is surjective up to compact operators. Then

$$\phi(\mathcal{K}(H)) \subseteq \mathcal{K}(H)$$

and the induced map $\varphi : \mathcal{C}(H) \to \mathcal{C}(H)$ is either an automorphism, or an anti-automorphism multiplied by an invertible element $\mathbf{a} \in \mathcal{C}(H)$.

Theorem III. Under the same hypothesis and notation as in (II), the following statements hold true:
(i) ϕ preserves Fredholm operators in both directions;
(ii) there is an $n \in \underline{Z}$ such that either

$$\mathrm{ind}(\phi(T)) = n + \mathrm{ind}(T) \;\text{ or }\; \mathrm{ind}(\phi(T)) = n - \mathrm{ind}(T)$$

for every Fredholm operator T,

Observe that every $n \times n$ complex matrix has a generalized inverse (resp. is semi-Fredholm, Fredholm), and therefore, every linear map on a matrix algebra preserves generalized invertibility (resp. semi-Fredholm, Fredholm) in both directions. So, we have here an example of a linear preserver problem which makes sense only in the infinite-dimensional case.

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Mehdi Monfared (Windsor) monfared@uwindsor.ca

ON REPRESENTATIONS SUBORDINATE TO TOPOLOGICALLY INTROVERTED SPACES

Saturday, August 6, MC4020, 10:00–10:25

Let A be a Banach algebra and X be a faithful topologically (left) introverted subspace of A^*. A continuous representation π of A is said to be subordinate to X if all of the coordinate functions of π are in X. We show there exists a bijection (preserving irreducibility) between representations of A subordinate to X and the representations of the Banach algebra X^*. If $\pi\colon A \to \mathcal{L}(\mathcal{H})$ is subordinate to X, (under suitable conditions) we call an element $\overline{\Phi} \in \ell^\infty(I, X^*)$ $(|I| = \dim(H))$ to be π-invariant if $a \cdot \overline{\Phi} = {}^t\pi(a)\overline{\Phi}$ for all $a \in A$. We show an interesting connection between the vanishing of certain Hochschild cohomology groups of A and the existence of such π-invariant elements. The role of π-invariant elements in identifying left ideals in X^* will be also discussed.

Returning to some concrete examples of X, we show that if A has a bounded approximate identity, then every weakly almost periodic functional on A is a coordinate function of a representation of A on a reflexive Banach space, subordinate to $WAP(A)$. We also show that for the case of $A = L^1(G)$, the conjugate representation associated to any unitary representation of G is subordinate to $LUC(A)$.

This talk is based on results of joint collaborations with M. Filali and M. Neufang.

Anthony O'Farrell (NUI, Maynooth) anthonyg.ofarrell@gmail.com
Reversibility and Banach algebras
Saturday, August 6, MC4020, 11:00–11:25

The concept of reversibility arose in classical dynamics. An invertible discrete dynamical system $f : X \to X$ is said to be *reversible* if there is an invertible homeomorphism $\phi : X \to X$ of the phase space that conjugates f to its inverse, i.e. $\phi^{-1} \circ f \circ \phi = f^{-1}$. More generally, an element f of a group G is *reversible in* G if it is conjugate in G to its inverse f^{-1}. Reversible elements of various groups arise naturally in connection with various problems, and this enables the use of dynamical methods to attack these problems. We shall describe some examples, involving uniform real and complex algebras. There are many questions about the revesible elements of a group. These have been studied extensively for finite and classical groups, and to some extent for larger groups, such as groups of homeomorphisms, diffeomorphisms, and biholomorphic maps. There are some results about the group of invertibles of some Banach algebras. We will survey these and direct attention to open questions, particularly about C^* algebras.

Lourdes Palacios (UAM-Iztapalapa) pafa@xanum.uam.mx
On the multiplier algebra of some topological algebras
Friday, August 5, MC4020, 4:30–4:55

If A is a topological algebra, a bounded mapping $T : A \to A$ is called a *left (right) multiplier* on E if $T(xy) = T(x)y$ (resp. $T(xy) = xT(y)$) for all $x, y \in A$; it is called a *two-sided multiplier* on E if it is both a left and a right multiplier. Denote by $\mathcal{M}_l(A)$, $\mathcal{M}_r(A)$ and $\mathcal{M}(A)$ the sets of all left, right and two-sided multipliers of A, respectively. Multipliers play an important role in different areas of mathematics with an algebra structure, due to important applications of non-normed topological algebras in other fields. It is known that, if B is a semisimple Banach algebra, then $\mathcal{M}(B)$ is a

Banach algebra under the operator norm and conatins B as an essential ideal. In this talk, we describe the multiplier algebra of a certain locally m-convex algebra with involution and a perfect projective system of decomposition. We give conditions under which $\mathcal{M}(A)$ is isomorphic to the inverse limit of the multiplier algebras of its normed factors; this happens, for instance, in locally m-convex H^*-algebras.

This is joint work with M. Haralampidou (Athens) and C. Signoret (UAM-Iztapalapa).

Thomas Vils Pedersen (Copenhagen) vils@life.ku.dk

COMPACTNESS AND WEAK-STAR CONTINUITY OF DERIVATIONS ON WEIGHTED CONVOLUTION ALGEBRAS

Thursday, August 4, MC4060, 4:00–4:25

Let ω be a continuous weight on $\mathbb{R}^+$ and let $L^1(\omega)$ be the corresponding convolution algebra. By results of Grønbæk and Bade & Dales, the continuous derivations from $L^1(\omega)$ to its dual space $L^\infty(1/\omega)$ are exactly the maps of the form

$$(D_\varphi f)(t) = \int_0^\infty \frac{s}{t+s} f(s)\varphi(t+s)\,ds \qquad (t \in \mathbb{R}^+ \text{ and } f \in L^1(\omega))$$

for some $\varphi \in L^\infty(1/\omega)$. Also, every D_φ has a unique extension to a continuous derivation $\overline{D}_\varphi : M(\omega) \to L^\infty(1/\omega)$ from the corresponding measure algebra. We show that a certain condition on φ implies that $\overline{D}_\varphi$ is weak-star continuous. The condition holds for instance if $\varphi \in L_0^\infty(1/\omega)$. We also provide examples of functions φ for which $\overline{D}_\varphi$ is not weak-star continuous. Similarly, we show that D_φ and $\overline{D}_\varphi$ are compact under certain conditions on φ. For instance this holds if $\varphi \in C_0(1/\omega)$ with $\varphi(0) = 0$. Finally, we give various examples of functions φ for which D_φ and $\overline{D}_\varphi$ are not compact.

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OPERATOR ALGEBRAS FROM ABELIAN SEMIGROUP ACTIONS

Tuesday, August 9, MC2065, 10:00–10:25

Let $\mathcal{S}$ be a discrete abelian semigroup with cancelation and identity element which acts by continuous surjections on a compact metric space X by an action σ . Form an algebra $\mathcal{A}_0$ which contains the continuous complex valued functions $C(X)$ together with formal operators S_t, $t \in \mathcal{S}$, satisfying the commutation relation

$$fS_t = S_t f \circ \sigma, \quad f \in C(X),\ t \in \mathcal{S}.$$

Thus a typical element of $\mathcal{A}_0$ has the form $\sum_{t\in\mathcal{S}} S_t f_t$ where the sum is finite.

We consider two classes of (Hilbert space) representations, the left regular representations and the orbit representations. If $\mathcal{A}_0$ is completed in the norm obtained by taking the supremum over the class of left regular representations, an operator algebra $\mathcal{A}$ is obtained. We discuss the C*-envelope of $\mathcal{A}$. The left regular representations turn out to be Shilov, while a certain class of orbit representations has a Shilov resolution.

The talk is based on joint work with Benton Duncan (`arXiv:1008.2244`).

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NONCOMMUTATIVE ANALOGUES OF STEIN ALGEBRAS

Friday, August 5, MC4020, 3:00–3:25

We define and study Fréchet algebras which may be viewed as noncommutative analogues of algebras of holomorphic functions on Stein spaces (Stein algebras). Our algebras are called *holomorphically finitely generated* (HFG) and are defined in terms of J. L. Taylor's free holomorphic functional calculus. We show that a *commutative* Fréchet algebra is HFG if and only if it is isomorphic to the algebra of holomorphic functions on a Stein space of finite embedding dimension. Combined with a theorem of O. Forster, this implies that the category of commutative HFG algebras is anti-equivalent to the category of Stein spaces of finite embedding dimension. Thus arbitrary (i.e., noncommutative) HFG algebras may be viewed as "noncommutative Stein spaces" (or, more exactly, as "noncommutative Stein spaces of finite embedding dimension").

We show the category of HFG algebras is stable under quotients and under analytic free products. This fact implies that many natural Fréchet algebras are in fact HFG, and also yields a number of new examples. For instance, the *Arens-Michael envelope* (i.e., the completion w.r.t. the family of all submultiplicative seminorms) of a finitely generated algebra is HFG. Following the above "noncommutative" philosophy, we may view the algebras obtained in this way as "algebras of holomorphic functions on noncommutative affine varieties" (or, more exactly, on "noncommutative affine schemes of finite type"). Among concrete examples of such algebras are the algebras of holomorphic functions on the quantum affine space and on the quantum torus. Other examples of HFG algebras include the algebras of holomorphic functions on the free polydisk, on the quantum polydisk, and on the quantum ball. Quite surprisingly, it turns out that the algebras of holomorphic functions on the quantum polydisk and on the quantum ball are isomorphic, in contrast to the classical case.

Krzysztof Piszczek (Adam Mickiewicz) `kpk@amu.edu.pl`

(DN)-(Ω) TYPE CONDITIONS FOR FRÉCHET OPERATOR SPACES

Wednesday, August 3, MC4021, 4:30–4:55

The so called (DN)-(Ω) type conditions turned out to be very important in the structure theory of Fréchet spaces. These topological invariants play a significant role in the splitting of short exact sequences which is then strongly connected with partial differential equations. In some sense they also seem to have much to do with the 40 year old (and still open) question of Pełczyński whether or not every complemented subspace of a Fréchet space with a basis has a basis itself. So far all the spaces with positive answer satisfy our conditions.

This gives a motivation to look for operator space analogues of these conditions. They seem to constitute an important ingredient if one tries to put together the structure theory of Fréchet spaces and the operator space theory. The talk will be a report on this attempt.

Denis Poulin (Carleton) `dpoulin@connect.carleton.ca`

ARENS REGULARITY OF FOURIER ALGEBRA AND STRONG TOPOLOGICAL CENTER

Friday, August 5, MC4020, 10:00–10:25

In 1981, A. T. Lau proved that for a locally compact amenable group G, the Arens regularity of the Fourier algebra $A(G)$ implies the finiteness of the group. A few years before, U. Haagerup introduced the class of weakly amenable groups which contains, for example, the free group over 2 generators. However, it was proved only in 2004 by V. Losert, that the Fourier algebra over a free group cannot be Arens regular. Unfortunately, there is not a complete description of the topological center for this algebra.

In this talk, we present a new approach to treat the Arens regularity. This approach uses a concept, introduced in the thesis of the speaker, the strong topological center, which is defined as follows. For a Banach algebra A, let

$$SZ_\ell = \{m \in A^{**} \mid \exists\, T \in B(A) : \lambda_m = T^{**}\}$$

where λ_m denotes left multiplication by m on A^{**} with respect to the left Arens product. With this tool, we give a complete description of the topological center of the Fourier algebra over any discrete weakly amenable group. We can then extend the result of A. T. Lau to all weakly amenable groups.

This is joint work with M. Neufang.

Gerhard Racher (Salzburg) gerhard.racher@sbg.ac.at

On the injectivity of some group modules

Tuesday, August 9, MC2017, 4:00–4:25

We show that a group is amenable if and only if it admits a (nontrivial) injective Banach module which is reflexive as a Banach space.

[1] H.G. Dales, M. Daws, H.L. Pham and P. Ramsden. *Multi-norms and the injectivity of $L^p(G)$.*

Thomas Ransford (Laval) ransford@mat.ulaval.ca

Do pseudospectra determine norm behavior of matrices with simple eigenvalues?

Wednesday, August 3, MC4020, 3:00–3:25

It has been known for nearly twenty years that pseudospectra do not determine norm behavior of matrices. More precisely, one can find pairs of square matrices A, B such that $\|(A - zI)^{-1}\| = \|(B - zI)^{-1}\|$ for all complex numbers z, yet $\|f(A)\| \neq \|f(B)\|$ for some polynomial f. However, the examples have always been non-generic, insofar as the matrices A, B in question have always had multiple eigenvalues. It has been an open problem whether pseudospectra determine norm behavior of matrices with only simple eigenvalues. In this talk I shall present a solution to the problem.

This is joint work with Jérémie Rostand.

Heinrich Raubenheimer (Johannesburg) hraubenheimer@uj.ac.za
THE INDEX FOR FREDHOLM ELEMENTS IN A BANACH ALGEBRA VIA A TRACE
Tuesday, August 9, MC2017, 10:00–10:25

We show that the existence of a trace on an ideal in a Banach algebra provides an elegant way to develop the abstract index theory of Fredholm elements in the algebra. We provide some results on the problem of equality of the nonzero exponential spectra of elements ab and ba and use the index theory to formulate a condition guaranteeing this equality in quotient algebras.

Maria Roginskaya (Chalmers/Gothenburg)
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PARISIAN SETS
Saturday, August 6, MC4020, 11:30–11:55

The Uncertainty Principle says that a function/measure can not be concentrated on a small set and have the Fourier transform supported on a small set at the same time. Rajchman sets are small in $\mathbb{Z}$ as their complement is dense in Gelfand topology. I will present a class of sets on $\mathbb{T}$ which can not support a singular measure with the Fourier transform supported by a Rajchman set.

Jean Roydor (Orleans & Kyoto)
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A NON-COMMUTATIVE AMIR-CAMBERN THEOREM
Tuesday, August 9, MC2065, 4:30–4:55

The Banach-Mazur cb-distance between two operator spaces X, Y is defined as:

$$d_{cb}(X,Y) = \inf\{\|T\|_{cb}\|T^{-1}\|_{cb}\},$$

where the infimum runs over all possible cb-isomorphism $T : X \to Y$ (this extends the classical Banach-Mazur distance between Banach spaces when these are endowed with their minimal operator space structure). Recall that Amir-Cambern Theorem asserts that if the Banach-Mazur distance between two $C(K)$-spaces is strictly smaller than 2, then these spaces are $*$-isomorphic as C^*-algebras. Here, we show a non-commutative Amir-Cambern Theorem for von Neumann algebras, more precisely: there exists $\varepsilon_0 > 0$ such that for any von Neumann algebras M, N, $d_{cb}(M, N) < 1 + \varepsilon_0$ implies $M = N$ $*$-isomorphically.

Ebrahim Samei (Saskatchewan) `samei@math.usask.ca`

SOME WEIGHTED GROUPS ALGEBRAS ARE OPERATOR ALGEBRAS

Monday, August 8, MC4041, 5:00–5:25

Let G be a finitely generated group with polynomial growth, and let ω be a weight on G. We study when the weighted group algebra $l^1(G, \omega)$ is an operator algebra. We demonstrate that there is a close connection between this question and the order of growth of G. We then show that for a large classes of weights including exponential weights with degree $0 < \alpha < 1$ and polynomial weights with degree larger than the order of growth of G, $l^1(G, \omega)$ is an operator algebra. This, in particular, implies that the algebraic centre of $l^1(G, \omega)$ is a Q-algebra and hence satisfies the multi-variable von Neumann's inequality. We also present a more details study of our results when G is the d-dimensional integers $\mathbb{Z}^d$.

This is a joint work with Hun Hee Lee and Nico Spronk.

Bertram Schreiber (Wayne State) `bert@math.wayne.edu`

MORE ON TOPOLOGICAL ALGEBRAS OF RANDOM ELEMENTS

Thursday, August 4, MC4060, 4:30–4:55

For a Banach algebra A and a probability space $(\Omega, \mathcal{F}, P)$, let $L_0(\Omega; A)$ denote the topological algebra of A-valued, Bochner measurable random variables, with the topology of convergence in probability. At the Quebec conference in 2007, I discussed some topological-algebra properties of $L_0(\Omega; A)$. I will return to this subject in this talk and discuss some further analysis of this algebra and modules over it.

Orr Shalit (Waterloo & Ben-Gurion) oshalit@uwaterloo.ca

BANACH ALGEBRAIC CLASSIFICATION OF UNIVERSAL OPERATOR ALGEBRAS USING SUBPRODUCT SYSTEMS

Wednesday, August 10, MC4061, 10:00–10:25

Given a family $\mathcal{I}$ of homogeneous polynomials in d non-commuting variables, one may construct the universal operator algebra $\mathcal{A}_\mathcal{I}$ generated by a (contractive) tuple $T_1, \ldots, T_d$ that satisfies

$$p(T_1, \ldots, T_d) = 0 , \quad \text{for all } p \in \mathcal{I}.$$

In this talk we discuss the precise sense in which the family of polynomials $\mathcal{I}$ determines and is determined by the Banach algebraic structure of the algebra $\mathcal{A}_\mathcal{I}$. As a result we find that two such algebras $\mathcal{A}_\mathcal{I}$ and $\mathcal{A}_\mathcal{J}$ are isometrically isomorphic if and only if they are completely isometrically isomorphic.

An interesting feature of the proof is that it makes use of *subproduct systems* — a structure that was introduced in quantum dynamics for completely different reasons.

This talk is based on joint works with Ken Davidson, Christopher Ramsey and Baruch Solel.

Piotr Sołtan (Warsaw) Piotr.Soltan@fuw.edu.pl

AN APPLICATION OF PROPERTY (T) FOR DISCRETE QUANTUM GROUPS

Monday, August 8, MC4020, 3:00–3:25

A short introduction to property (T) for discrete quantum groups will be given. Using various equivalent descriptions of this property we will be able to solve some questions about existence of so called "exotic" completions of algebras of polynomials on compact quantum groups.

Ross Stokke (Winnipeg) r.stokke@uwinnipeg.ca

HOMOMORPHISMS OF CONVOLUTION ALGEBRAS

Thursday, August 4, MC4061, 3:00–3:25

In 1960, Paul Cohen gave an elegant description of all homomorphisms $\varphi : L^1(F) \to M(G)$ when F and G are abelian locally compact groups.

In the abelian contractive case, Cohen's result provides a factorization of φ into four canonically defined, and well-understood, homomorphisms. For arbitrary locally compact groups F and G, F. Greenleaf successfully characterized all contractive homomorphisms $\varphi : L^1(F) \to M(G)$ in 1965. This characterization is, however, less tractable than the one obtained by Cohen in the abelian case. It can thus be asked if there is a factorization of contractive homomorphisms which is more closely in the spirit of Cohen's theorem. Specifically, in 1975 Kerlin and Pepe asked whether every contractive homomorphism $\varphi : L^1(F) \to M(G)$ has a Cohen factorization when F and G are not assumed to be abelian. In this talk, I will describe a negative solution to this latter question. I will then indicate how the former, general problem has a positive solution, by providing a factorization of any contractive homomorphism $\varphi : L^1(F) \to M(G)$ into four homomorphisms, where each of the four factors is one of the natural types appearing in the Cohen factorization. As time permits, I will describe some related results and some applications.

Elizabeth Strouse (Bordeaux I)
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TRUNCATED TOEPLITZ OPERATORS - WHAT DO THEY 'LOOK LIKE'?
Wednesday, August 3, MC4021, 10:00–10:25

Truncated Toeplitz operators are a generalization of the operators associated with Toeplitz matrices and operators (discussed in detail in a recent survey paper by Sarason [3]). They are equal to the composition of a multiplication operator with projection on a *model space*, i.e. the orthogonal complement of a shift invariant subspace of the Hardy space. I will be talking about questions and answers concerning similarity and unitary equivalence to these operators ([1],[2],[4]).

[1] Cima, J., Garcia, S. Ross, W. and Wogen, W., *Truncated Toeplitz operators: spatial isomorphism, unitary equivalence, and similarity*, Indiana Univ. Math. J. 59(2):595-620, 2010.

[2] Garcia, S., Poore D., Ross, W., *Unitary equivalence to a truncated Toeplitz operator: analytic symbols*, to appear PAMS.

[3] Sarason, D. *Algebraic properties of truncated Toeplitz operators.* Oper. Matrices, 1 (2007), 491-526.

[4] E. Strouse, D. Timotin, M Zarrabi, *Unitary equivalence to truncated Toeplitz operators*, Indiana Journal, to appear.

Lyudmyla Turowska (Chalmers/Gothenburg) `turowska@chalmers.se`
SCHUR MULTIPLIERS AND CLOSABILITY PROPERTIES
Thursday, August 9, MC2065, 11:30–11:55

Let (X, μ) and (Y, ν) be measure spaces, and let $H_1 = L_2(X, \mu)$, $H_2 = L_2(Y, \nu)$. There is a method (due mainly to Birman and Solomyak) to relate to some bounded functions φ on $X \times Y$ linear transformations S_φ on the space $B(H_1, H_2)$ (these transformations are called *Schur multipliers* or, in a more general setting of spectral measures μ, ν, *double operator integrals*). Namely one defines firstly a map S_φ on Hilbert Schmidt operators multiplying their integral kernels by φ; if this map turns out to be bounded in operator norm, extend it to the space $K(H_1, H_2)$ of all compact operators by continuity. Then S_φ is defined on $B(H_1, H_2)$ as the second adjoint of the constructed map of $K(H_1, H_2)$. A characterisation of all such multipliers was first established by Peller: Schur multipliers are percisely the functions of the form

$$\varphi(x, y) = \sum_k a_k(x) b_k(y)$$

such that $(\operatorname{esssup} \sum |a_k(x)|^2)(\operatorname{esssup} \sum |b_k(x)|^2) < \infty$.

We shall discuss the question for which φ the map S_φ is closable in the operator norm or in the weak* topology of $B(H_1, H_2)$. If φ is of Toeplitz type, i.e. $\varphi(x, y) = f(yx^{-1})$, $x, y \in G$, where G is a locally compact group then the question is related to certain questions about the Fourier algebra $A(G)$; if $\varphi(x, y)$ is of the form $(f(x) - f(y))/(x - y)$ then the property is related to "operator smoothness" of f.

This is a joint work with V. Shulman and I. Todorov.

Armando Villena (Granada) `avillena@ugr.es`
APPROXIMATELY SPECTRUM–PRESERVING MAPS
Wednesday, August 3, MC4020, 11:30–11:55

Let X and Y be superreflexive complex Banach spaces and let $\mathcal{B}(X)$ and $\mathcal{B}(Y)$ be the Banach algebras of all bounded linear operators on X and Y, respectively. If a bijective linear map $\Phi \colon \mathcal{B}(X) \to \mathcal{B}(Y)$ almost preserves the spectra, then it is almost multiplicative or anti-multiplicative. Furthermore, in the case where $X = Y$ is a separable complex Hilbert space, such a map is a small perturbation of an automorphism or an anti-automorphism.

Ami Viselter (Technion & Alberta) `viselter@techunix.technion.ac.il`
CUNTZ-PIMSNER ALGEBRAS FOR SUBPRODUCT SYSTEMS
Wednesday, August 10, MC4061, 11:00–11:25

The study of Cuntz-Pimsner algebras of C^*-correspondences has its origins in an influential paper of Pimsner. Originally defined merely for faithful C^*-correspondences, the Cuntz-Pimsner algebra was shown to be a quotient of the Toeplitz algebra of the correspondence. Subsequently, Katsura provided a definition for general C^*-correspondences, which is the one most commonly used today. The construction is flexible enough to generalize, at the same time, the Cuntz-Krieger algebras, crossed products and others. The fundamental "gauge-invariant uniqueness theorem" makes it particularly convenient to handle. Many aspects of this algebra have been comprehensively studied, for instance: exactness and nuclearity, ideal structure, K-theory and Morita equivalence.

The notion of a subproduct system, generalizing that of (the product system associated with) a C^*-correspondence, has been systematically studied recently by several authors. In particular, some work has been done on its associated tensor and Toeplitz algebras and their representations.

In this talk we will present an attempt to extend the concept of Cuntz-Pimsner algebras to the setting of subproduct systems. For example, when restricted to the case of Arveson's d-dimensional "symmetric" subproduct system, our construction yields, as expected, the C^*-algebra of continuous functions on the boundary of B_d (and the suitable infinite-dimensional version of this assertion also holds). We will demonstrate via examples why some features of the Cuntz-Pimsner algebras of C^*-correspondences fail to generalize "easily" to our setting, and discuss what we have instead.

Michael White (Newcastle, UK) `michael.white@newcastle.ac.uk`
BANACH ALGEBRAS ARISING FROM QUIVERS
Thursday, August 4, MC4061, 10:00–10:25

A *quiver* is a directed graph. The path algebras of quivers encompass many well-known algebras: the simplest examples are the polynomials in 1 variable, the higher rank free semigroup algebras, and the upper triangular matrices, all of these have Banach algebra completions. Quivers also have associated

C^*-algebras, which are generated by partial isometries corresponding to forward paths and adjoints corresponding to the reversed paths. This class of C^*-algebra includes the Cuntz-Krieger algebras, which are amenable. In this talk we will consider analogous ℓ^1-algebras, which can similarly be constructed from the inverse semigroup of paths on a quiver. These ℓ^1-algebras are rarely amenable, but we will show that they have relatively simple cyclic cohomology. This cohomology is reminiscent of the elegant K-theory of the Cuntz-Kreiger algebras, given by the idempotent structure in the C^*-algebras.

Yong Zhang (Manitoba) `zhangy@cc.umanitoba.ca`
WEAK AMENABILITY OF BEURLING ALGEBRAS
Friday, August 5, MC4020, 11:00–11:25

For a locally compact Abelian group G and a continuous weight function ω on G, I will show that the Beurling algebra $L^1(G, \omega)$ is weakly amenable if and only if there is no nontrivial continuous group homomorphism ϕ: $G \to \mathbb{C}$ such that $\sup_{t\in G} \frac{|\phi(t)|}{\omega(t)\omega(t^{-1})} < \infty$. Many special cases will be discussed. If time permits I will also talk about 2-weak amenability for Abelian Beurling algebras, presenting a new result that improves some known results.